

# PATENT SPECIFICATION

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(23) Complete Specification filed 3 Dec. 1970  
(44) Complete Specification published 22 Aug. 1973  
(51) International Classification F16B 2/18  
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(72) Inventor FRANZ JOSEF HERBSTHOFER



(54) A KNIFE FOR AN AGRICULTURAL IMPLEMENT, THE  
KNIFE HAVING SEPARABLE PORTIONS, AND MEANS FOR  
RELEASABLY FASTENING SAID PORTIONS TOGETHER

(71) We, MASSEY-FERGUSON GMBH

SPECIFICATION NO 1327389.

By a direction given under Section 17 (1) of the Patents Act 1949 this application proceeded in the name of MASSEY-FERGUSON SERVICES N.V., a Corporation organised and existing under the laws of the Netherlands Antilles, of Abraham de Veerstraat 7a, Curacao, Netherlands Antilles.

THE PATENT OFFICE

R 70875/9

is provided in combination, a knife for an agricultural implement, the knife having separable end-to-end portions, and means for releasably fastening said portions together, said means being in the form of an over-centre, toggle-action clip comprising first and second body portions secured respectively to adjacent ends of said knife portions, an operating lever pivotally connected at one end to said first body portion, a bridge-piece pivotally connected at one end to said lever intermediate the latter's connection to said first body portion and its free end, co-operable fastening means on the free end of the bridge-piece and on said second body portion, respectively, and in which opposed end faces of said body portions have co-operable locating formations which abut in the fastened position of the clip so that said body portions are located in the same relative position on each occasion on which the clip is fastened.

Preferably, said locating formations comprise co-operating projections and recesses.

Preferably also, said projections and recesses are substantially wedge shaped.

The body portions may be provided at their opposed end parts with parallel upstanding walls extending longitudinally of the portions. The operating lever may be

which:

Fig. 1 is a perspective view of portions of a knife for a combine harvester, and means in the form of a clip for releasably fastening said portions together; 60

Fig. 2 is a side view of the clip; 65

Fig. 3 is a plan view of body portions of the clip corresponding to Fig. 2;

Fig. 4 is a plan view showing a development of the body portions corresponding to Fig. 3; and 70

Fig. 5 is a general perspective view of the clip.

Referring to the drawings, an over-centre, toggle-action clip, indicated generally at 1, comprises first and second body portions 2 and 3 connected to adjacent portions 4 and 5 respectively, of a multi-piece knife for a combine harvester (not shown). Parallel upstanding walls 6 are formed along the longitudinal edges of each body portion 2 and 3. An operating lever 7 is pivotally connected at 8 between the walls 6 of the first body portion 2, and a bridge piece 9 is provided to connect the lever 7 to the second body portion 3. The bridge piece 9 includes a pivot block 10, journalled in the lever 7 intermediate the pivot 8 and the lever's free end 11, and a T-piece 12, the stem 13 of which passes through a hole 14 in the pivot block 10. The T-piece 12 is 80

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(72) Inventor FRANZ JOSEF HERBSTHOFER



## (54) A KNIFE FOR AN AGRICULTURAL IMPLEMENT, THE KNIFE HAVING SEPARABLE PORTIONS, AND MEANS FOR RELEASEABLY FASTENING SAID PORTIONS TOGETHER

(71) We, MASSEY-FERGUSON G.m.b.H., a body corporate organised and existing under the laws of the German Federal Republic, of Standplatz 23, Kassel, German 5 Federal Republic, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following 10 statement:

This invention relates to a knife for an agricultural implement, the knife having separable portions, and means for releasably fastening said portions together.

15 According to the present invention there is provided in combination, a knife for an agricultural implement, the knife having separable end-to-end portions, and means for releasably fastening said portions together, said means being in the form of an over-centre, toggle-action clip comprising first and second body portions secured respectively to adjacent ends of said knife portions; an operating lever pivotally connected 20 at one end to said first body portion, a bridge-piece pivotally connected at one end to said lever intermediate the latter's connection to said first body portion and its free end, co-operable fastening means on 25 the free end of the bridge-piece and on said second body portion, respectively, and in which opposed end faces of said body portions have co-operable locating formations which abut in the fastened position of the 30 clip so that said body portions are located in the same relative position on each occasion on which the clip is fastened.

35 Preferably, said locating formations comprise co-operating projections and recesses.

40 Preferably also, said projections and recesses are substantially wedge shaped.

The body portions may be provided at 45 their opposed end parts with parallel up-standing walls extending longitudinally of the portions. The operating lever may be

journalled between the walls on the first body portion, and the fastening means on the second body portion may be in the form of notches in its walls. Locating formations may also be provided on the opposed end 50 faces of the upstanding walls, and the bridge-piece may comprise a pivot block, a T-piece passing through said block and a compression spring extending between the block and an adjustable abutment member 55 on the T-piece.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:—

60 Fig. 1 is a perspective view of portions of a knife for a combine harvester, and means in the form of a clip for releasably fastening said portions together;

65 Fig. 2 is a side view of the clip;

Fig. 3 is a plan view of body portions of the clip corresponding to Fig. 2;

70 Fig. 4 is a plan view showing a development of the body portions corresponding to Fig. 3; and

75 Fig. 5 is a general perspective view of the clip.

Referring to the drawings, an over-centre, toggle-action clip, indicated generally at 1, comprises first and second body portions 2 and 3 connected to adjacent portions 4 and 5 respectively, of a multi-piece knife for a combine harvester (not shown). Parallel upstanding walls 6 are formed along the longitudinal edges of each body portion 2 80 and 3. An operating lever 7 is pivotally connected at 8 between the walls 6 of the first body portion 2, and a bridge piece 9 is provided to connect the lever 7 to the second body portion 3. The bridge piece 9 includes a pivot block 10, journalled in the lever 7 intermediate the pivot 8 and the lever's free end 11, and a T-piece 12, the stem 13 of which passes through a hole 14 in the pivot block 10. The T-piece 12 is 85

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retained in the block 10 by a compression spring 15 located around the stem 13 and extending between the block 10 and an adjustable abutment 16 in the form of a nut 5 co-operable with a threaded end-portion of the stem.

The head 17 of the T-piece is co-operable with notches 18 in the upstanding walls 6 on the second body portion 3 so as to form 10 fastening means.

In multi-piece knives for combine harvesters it is essential that each time adjacent portions are fastened together they are in the same relative position. Thus, in order 15 to ensure that the body portions 2 and 3 are fastened together in the same relative position, the opposed end faces 19 and 20, respectively, of the body portions 2 and 3, which abut when the clip is fastened, are 20 provided with locating formations comprising substantially wedge-shaped projections 21 co-operable with correspondingly shaped recesses 22. In order to prevent relative movement of the body portions 2 and 3 in 25 a vertical direction, as well as in a horizontal direction 8, locating formations 21, 22 are also provided on the opposed end faces of the upstanding walls 6.

The body portions 2 and 3 may be 30 manufactured in any convenient manner, but it has been found particularly advantageous to stamp the development of both portions (Fig. 4) from a single piece of metal using one set of dies, and subsequently bending the upstanding walls 6 into position, again using one set of dies. Thus, 35 accuracy of engagement of the locating formations is ensured.

#### 40 WHAT WE CLAIM IS:

1. In combination, a knife for an agricultural implement, the knife having separable end-to-end portions, and means for releasably fastening said portions together, 45 said means being in the form of an over-centre, toggle-action clip comprising first and second body portions secured respectively to adjacent ends of said knife portions, an operating lever 50 pivotally connected at one end to said first body portion, a bridge-piece pivotally connected at one end to said lever intermediate the latter's connection to said first body portion and its free end, co-operable 60 fastening means on the free end of the

bridge-piece and on said second body portion, respectively, and in which opposed end faces of said body portions have co-operable locating formations which abut in the fastened position of the clip so that 65 said body portions are located in the same relative position on each occasion on which the clip is fastened.

2. The combination according to claim 1 in which said locating formations on the 70 clip comprise co-operating projections and recesses.

3. The combination according to claim 2, in which said projections and recesses are 75 substantially wedge shaped.

4. The combination according to claim 1 or 2 or 3, in which the body portions of the clip are provided at their opposed end parts with parallel upstanding walls extending longitudinally of the portions. 80

5. The combination according to claim 4, in which the operating lever of the clip is journaled between said upstanding walls on the first body portion.

6. The combination according to claim 4 or 5, in which the fastening means on the second body portion of the clip is in the form of notches in its upstanding walls. 85

7. The combination according to claim 4 or 5 or 6, in which location formations 90 are provided on the opposed end faces of the upstanding walls.

8. The combination according to any preceding claim, in which the bridge-piece of the clip comprises a pivot block, a T- 95 piece passing through said block and a compression spring extending between the block and an adjustable abutment member on the T-piece.

9. In combination, a knife for an agricultural implement, the knife having separable end-to-end portions, and means for releasably fastening said portions together, substantially as hereinbefore described with reference to Fig. 1 of the accompanying 100 drawings. 105

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Sheet 1

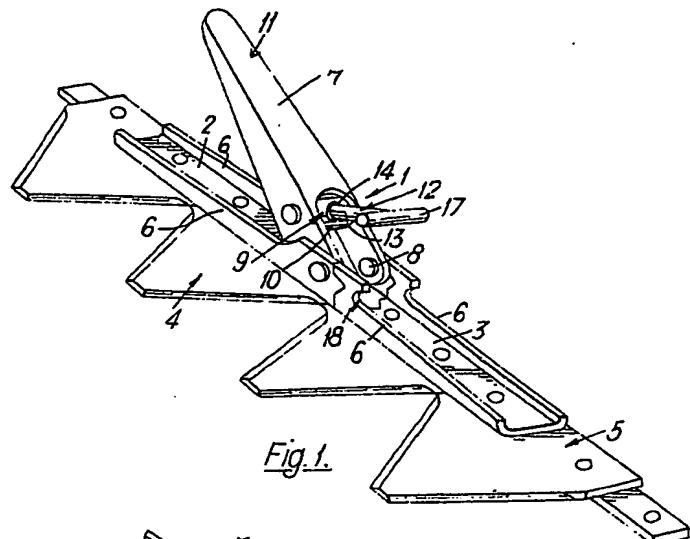


Fig. 1.

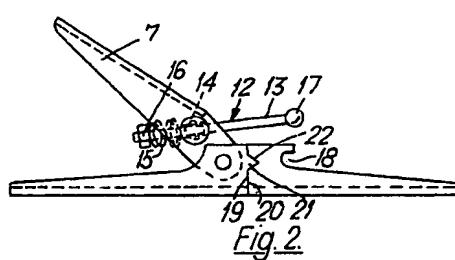


Fig. 2.

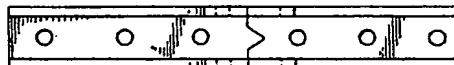


Fig. 3.

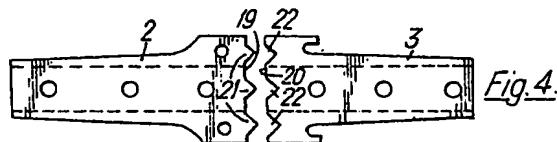


Fig. 4.

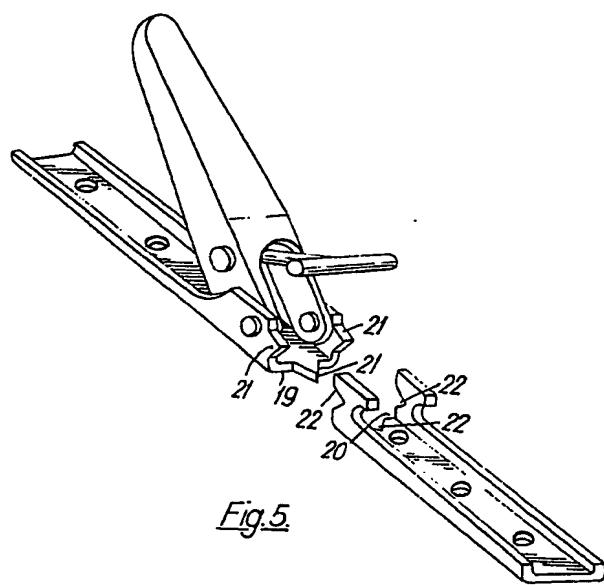
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2 SHEETS

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Sheet 2



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